

NATIONAL INSTITUTES OF HEALTH  
WARREN GRANT MAGNUSON CLINICAL CENTER  
NURSING and PATIENT CARE SERVICES

Standards of Practice: **Care of the Patient with an Intracranial Pressure (ICP) Monitoring Device**

- I. **ASSESSMENT** - Assess hourly:
  - A. Neurological Assessment to include Glasgow Coma Scale and:
    - 1. Level of consciousness and mental status
    - 2. Pupil size and shape and light response
    - 3. Extraocular movements and visual acuity
    - 4. Motor movement
    - 5. Extremity strength
    - 6. Headache, nausea, & vomiting
    - 7. Fontanelles, cranial sutures, & head circumference for pediatric patients < 2 years
    - 8. Seizure activity
  - B. ICP (normal adults < 10 - 15 mm Hg, pediatric patients: Newborn 0.7 - 1.5mm Hg, Infant 1.5 - 6.0 mm Hg, Children 3.0 - 7.5 mmHg.
  - C. Cerebral Perfusion Pressure (CPP) (MAP - ICP; normal 70-100 mm. Hg; normal CPP in pediatric patients is variable and dependent upon the age-related MAP but should be at least 40-60 mmHg.).
  - D. Changes in ICP waveform
  - E. Catheter insertion site to include:
    - 1. CSF leakage
    - 2. Bleeding
    - 3. Swelling and inflammation
    - 4. Integrity of dressing
  - F. Cerebral Spinal Fluid (CSF) output to include:
    - 1. Color
    - 2. Amount
    - 3. Clarity
  - G. Patency of system and height of collection chamber or transducer (if applicable to system)
  - H. Changes in ICP related to turning, head position, crying, coughing, and environmental stimuli.
  - I. Vital signs including any widening of pulse pressure.
  - J. Ventilatory status to include:
    - 1. Oxygen saturation
    - 2. Rate, depth, & changing pattern of respirations
    - 3. pH and pCO<sub>2</sub> (when ordered)
  - K. Hydration status to include:
    - 1. Urine and output
    - 2. Urine specific gravity
    - 3. Skin turgor

4. Serum osmolality
5. Pulmonary Capillary Wedge Pressure (PCWP) (when ordered)
6. Central Venous Pressure (CVP) (when ordered)

## II. INTERVENTIONS

- A. Verify physician's orders for hourly ventricular drainage parameters.
- B. Maintain head of bed flat or raised to a prescribed height as ordered or depending on ICP and CPP measurements. Clarify head position with physician.
- C. Maintain head and neck in neutral position. Avoid hyperflexion, hyperextension, or severe rotation.
- D. Verify the physician's order for insertion site dressing changes.
- E. Maintain integrity as a closed system.
- F. Inspect the system for kinks and leaks in the circuit.
- G. Change drainage bag when the drainage bag is 3/4 full or in place for 72 hours (verify with neurosurgeon). Mark drainage bag with time and date. Maintain aseptic technique. For breaks in the sterile system, notify MD.
- H. If monitoring ICP pressures, zero the system at least q 8 hr. and as needed.
- I. Set ICP alarms 10 mm Hg lower and higher than the patient's usual range.
- J. Secure endotracheal tubes in ways that do not occlude venous return to the head.
- K. Suctioning can increase ICP. Decrease suctioning time if appropriate. If coughing occurs, consider administering lidocaine via the endotracheal tube per MD order.
- L. Space activities of care.
- M. Decrease environmental stimuli.
- N. Provide cooling measures to maintain normal body temperature.
- O. Administer stool softener as per physician order to prevent constipation and straining.
- P. Notify physician for:
  1. Changes in neurological signs
  2. Elevated ICP and/or values greater than 15 mm Hg. for 5 minutes or more
  3. CPP greater than 100 mm Hg. or less than 70 mm Hg.
  4. Temperature or WBC elevation
  5. CSF leakage
  6. Change in CSF drainage amount, color and clarity
  7. Malfunction of the monitoring system.
- Q. Troubleshoot the ICP fluid filled system for problems such as:
  1. Breaks in the system
  2. Dampened waveform
  3. Loss of wave form
  4. Occlusion of tubing
  5. Change in CSF drainage amount
  6. Administer sedation per MD order
- R. Minimize any increases in intra-abdominal/intrathoracic pressure (an increase in intra-abdominal pressure may require gastric decompression)
- S. Patient and Family Education
  1. Teach regarding the need and rationale to maintain specific head position.

2. Teach regarding the effects of environmental stimuli on ICP.
3. Discuss family's role in controlling environmental stimuli.

### III. DOCUMENTATION

- A. Document hourly on the approved Critical Care Flow Sheet the CPP and ICP values as well as at least hourly neurologic assessment.
- B. Document all nursing assessments and interventions.

### IV. REFERENCES:

- A. March, K. (2000) Intracranial pressure monitoring and assessing intracranial compliance in brain injury. Critical Care Nursing Clinics of North America. Dec;12(4):429-36.
- B. Palmer, J. (2000) Management of raised intracranial pressure in children. Intensive Critical Care Nursing. Oct;16(5):319-27.
- C. Kinney, M., Packa, D. et.al.(2002) AACN's Clinical Reference for Critical Care Nursing. St. Louis Mosby.
- D. Hickey, J. (2002) The Clinical Practice of Neurological and Neurosurgical Nursing, 4th edition, Lippincott, Philadelphia.

Approved:

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